

METHOD AND SYSTEM FOR MANAGING AND DELIVERING WEB  
CONTENT TO INTERNET APPLIANCES

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10 BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to accessing to  
information over the Internet. In particular, the  
present invention relates to a customized access to  
15 information over the Internet by various internet  
appliances with various processing capabilities.

2. Discussion of the Related Art

As the Internet has become a preferred medium for  
information access and dissemination, many different  
20 devices (e.g., mobile phones, personal digital  
assistants and handheld computers) can now be used to  
access information on the Internet. In general, these  
devices typically have much lesser text and graphical  
processing capabilities than a conventional desktop  
25 computer. (For convenience, in the remainder of this  
description, these devices are collectively referred to  
as "internet appliances".) As much of the information  
on the Internet is organized for access by a desktop  
computer using a hypertext protocol (e.g., http),  
30 access to such information by a device other than a  
desktop computer can be inefficient. For example, many

web pages are designed with a high-resolution graphical display in mind. Even when possible, accessing such web pages from a mobile telephone without a graphical display and providing only a limited number of short lines for text display can be a very frustrating experience.

To accommodate the different capabilities of the internet appliances, in the prior art, an operator of a website typically provides for each supported internet appliance a specialized "edition" of the website accessible through a specialized gateway. For example, since the current generation of mobile telephones are typically only capable of displaying text of a small number of characters per line, an operator would provide specially designed text-only "stripped down" web pages accessible through a wireless access protocol (WAP) gateway. In most instances, information available in the general edition of the web pages are included or excluded by the designer or operator based on its resource availability or other criteria, without user participation. Often, therefore, information important to some users is arbitrarily excluded, thereby severely reducing the utility of the web pages.

Where a specialized website is not available, the gateway would provide only the text from the web pages and discard or ignore graphical information, animation or other functions embedded in the web pages. In such an instance, no attempt is typically made to filter the information based on the content of a web page. Consequently, a relatively small web page can result in the user pressing the "scroll" key a large number of times. Many users therefore do not consider internet appliances to be suitable for serious information retrieval purposes.

## SUMMARY OF THE INVENTION

The present invention provides a method and a system for customizing a structured document (e.g., a web page) for delivery to an internet appliance. The present invention allows a structured document to be customized according to a user's preferences and according the particular requirements of an accessing device, rather than arbitrarily determined by a gateway operator or a web service provider of the structured document.

In one embodiment, a method of the present invention includes: (a) identifying information units in the structured document; (b) selecting one or more of the information units for delivery; (c) creating in a database a second structured document which includes the selected information units; and (d) delivering the second structured document to the internet appliance. In one implementation, the second structured document is provided in the database in the form of an XML document.

In one embodiment, a management server creates a menu for selection, which includes the information units identified in the structured document. The menu is typically presented to the user who is using a conventional browser running on a machine with a high-resolution graphical display. Typically, after the customization is complete, subsequent access to the customized structured document is provided to an internet appliance with limited bandwidth or display capability, such as a mobile telephone, a personal digital assistant, or a hand-held computer.

Typically, the user logs into the management server using standard verification procedures (e.g.,



(e) a device profile record associating the user\_client record with the device record. In one embodiment, the database further includes a channel record associated with the user\_client record to represent a pre-  
5 configured resource. To associate the customized structured documents with the user and the associated device, a site record is provided associating the user\_client record. In turn, a customization record associates the site record with modification of the  
10 resource or structured document in accordance with the device profile record.

In one embodiment, a document customization system of the present invention includes: (a) a management server offering a document customization service to a user; (b) a document manager associated with the management server performing the document customization service to structured documents identified by the user; (c) a database accessible by the document manager, the database storing customized structured documents resulting from the document customization service; and (d) a portal for accessing the customized structured documents in the database. The document manager parses a structured document to identify information units in the structured document. In one implementation, the customized structured documents are stored in a hypertext format, such as XML.

In one embodiment, the management server provides a user a web page-based interface to the document manager.

30           The present invention is better understood upon  
consideration of the detailed description below and the  
accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram 100 of a system providing customized access to web content in accordance with one embodiment of the present invention.

5        Figure 2 is a flow diagram 200 illustrating interactions between management server 105 and a user during a management session, in accordance with the present invention.

10       Figure 3 is a flow diagram 300 illustrating the interactions between an internet appliance and portal 108 during an access of web resources by the internet appliance, in accordance with the present invention.

Figure 4 shows a data structure 400 suitable for use with the operations of management server 105.

15       Figure 5 is a block diagram illustrating procedure 500, which creates a bookmark for a first internet appliance, in accordance with an embodiment of the present invention.

20       Figure 6 shows a web page illustrating one application of the present invention.

Figure 7 shows a menu listing information units identified during processing of the web page of Figure 6 by a document manager, in accordance with one embodiment of the present invention.

25       Figure 8 shows the image of a processed web page received by an internet appliance, based on user preference determined from the menu listing of Figure 7.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention allows a user customized access to any web page on the Internet using an internet appliance. Unlike customized access in the prior art, the user, rather than the operator of a web page, controls the selection of web material to be delivered when accessed using an internet appliance. Further, under the present invention, a user can set up a different customized access to a web page according to the individual capabilities of each internet appliance used. To simplify this detailed description, like elements among the figures are assigned like reference numerals.

Figure 1 is a block diagram of system 100 providing customized access to web content in accordance with one embodiment of the present invention. In system 100, as shown in Figure 1, management server 105 provides an interface ("management session") through which a user can customize selected web content for later access using one or more internet appliances through portal 108. Typically, a user accesses management server 105 using a "traditional" web browser. By a "traditional" web browser is meant a web browser, such as Internet Explorer available from Microsoft Corporation, Redmond, WA which is typically run from a desktop or lap-top computer, with relatively high-resolution graphical capabilities.

As explained in further detail below, management server 105 is associated with a document database system 107. According to the present invention, web content is treated as structured documents consisting of inter-related "information units." A typical web page written in HTML, XML, SGML, or another marked up language is an example of a structured document. Such a structured document typically includes text,

graphical images, executable application programs ("applets"), and embedded links to other structured documents. In the embodiment shown in Figure 1, document manager 106 parses a structured document to  
5 break down the structured document into component inter-related information units and stores the information units into database 107. The user, through document manager 106, can manipulate these information units to create new documents, which can be output in  
10 various formats (e.g., HTML, Microsoft Word, WML, PHTML etc.). In one embodiment, structured documents are stored in database 107 as XML documents. The elements of an XML document can be treated as information units.

One example of a document manager suitable for use  
15 in conjunction with the present invention is disclosed in a copending patent application (the "Copending Application"), entitled "Method and System for Managing Reusable Information Units," serial no. \_\_\_\_\_, filed on May 4, 2000, which claims priority to a provisional  
20 patent application, entitled "Method and System for Managing Reusable Information Units," serial no. 60/132,674, filed May 5, 1999. The Copending Application is hereby incorporated by reference in its entirety. A document manager related to the Copending  
25 Application, which is also suitable for use in conjunction with the present invention is the Directive product, offered by Hynet Technologies.

Portal 180 is a gateway provided for communication with a mobile device, such as a web browser 103 running  
30 on a mobile telephone, or an information retrieval application program 102, running on an internet appliance (e.g., the iLocator Module from @Road, Inc.) Communication with portal 180 is performed using a protocol specific to the internet appliance (e.g.,



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wireless application protocol (WAP) for a cellular or mobile telephone).

In one application, a user specifies through manager 105 a number of hyperlinks -- which are  
5 pointers to other information units -- of a web page to be made selectable from a mobile telephone. During a subsequent access to the web page through portal 108, portal 108 retrieves the modified web page -- i.e., processed to include the specified hyperlinks -- from  
10 database 107, and made the hyperlinks available for selection from the display device on the mobile telephone. When portal 108 retrieves the web page from database 107, if the web page is provided as a reference in database 107, access to the corresponding  
15 web resource (e.g., web resource 101) over the internet may be performed.

In one application, the operator of management server 105 also provides a number of pre-configured resources ("channels") for each user. In conjunction  
20 with a method for determining the user's location, these pre-configured resources can be used to provide, for example, user location-specific information. For example, in one embodiment, an internet appliance can be provided a device for determining the user's present  
25 location using either a global positioning system (GPS) or a triangulation system (e.g., a cellular phone system). With such a means for determining the user's location, the channels can be used to deliver, for example, local traffic conditions and travel  
30 information (e.g., nearby service stations, restaurants, hotels, shopping centers etc.). In one embodiment, the user can further customize the channels by providing parametric values of his or her preferences, such as a range of distances within which

the channels would deem the information relevant, and a frequency of channel update.

Figure 2 is a flow diagram 200 illustrating interactions between management server 105 and a user during a management session, in accordance with the present invention. As shown in Figure 2, at step 201, the user enters the management session from an entry point, such as the home page of the operator of management server 105 (e.g., <http://www.atroad.com>).

In this instance, access to the user records is provided only upon proper identity verification procedure (step 202), such as by the user providing a user name and a password. If the user is not a registered user, registration may occur at step 203. In one embodiment, a user is associated with two files: "bmList.txt" and "menu.wml". "bmList.txt" is a file listing customized resources ("bookmarks") associated with the user. Portal 108 reads "menu.wml" to create a suitable menu for web content navigation using an internet appliance. Figure 4 shows a data structure 400 suitable for use with the operation of management server 105. For each user, a user record 401 is assigned.

In this example, upon entering the management session, the user is presented (step 204) a menu from which the user can select one of five procedures: (1) register a device, (2) configure a device, (3) create a bookmark, (4) modify a bookmark, and (5) associate a bookmark to a registered device.

From the menu of step 204, if the user elects to register a device (step 205), the user identifies the device to be registered from a list of devices (e.g., a particular make and model of a mobile telephone) known to management server 105. The user then enters

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identification and operational information specific to device (step 211), confirms the information (step 212) and creates and saves the device record into management server 105's device data base (steps 213 and 214). For  
5 each device, management server 105 retrieves user\_client record 406, which associates client record 402 with user record 401. (Client record 402, shown in Figure 4, identifies a client -- the identity of the subscriber to the current service). Management server  
10 105 then creates device profile record 404, which associates physical device record 403 with user\_client record 406. Physical device record 403 identifies the physical device in the database and references device information record 405, which provides additional  
15 information regarding the operational characteristics or attributes of the physical device (e.g., telephone number assigned to the device, email address to send any electronic mail to the device, model number etc.) Management server 105 then returns the user to step  
20 204.

From the menu of step 204, if the user elects to configure a registered device (step 206), management server 105 retrieves the profile of an existing device (step 216), and allows the user to edit the retrieved  
25 profile. When the user confirms the changes made (step 217), the user is allowed to authorize overwriting the existing device record (step 218), or to save the modified profile for a new device (step 219). The same profile can be applied to different device records  
30 (step 220). When the modifications are confirmed and saved (steps 221 and 222), management server 105 returns the user to step 204. In one embodiment, step 206 can also be used similarly to retrieve and modify the configuration of a channel. As shown in Figure 4,  
35 channel personalization record 409 and range value

record 410 are created to support these pre-configured channels. Channel personalization record 409, which includes identities of the channels the user has selected, associates the configurations of these channels to user\_client record 406. Channel personalization record 409 also associates with each channel valid range values defined in range value record 410. A procedure similar to that disclosed in steps 215-222 can be used to allow a modification of a channel configuration (e.g., changing range values).

From the menu of step 204, if the user elects to create a bookmark (step 207), management server 105 allows the user to create a bookmark from either a pre-processed list (step 223) of web resources, or enters a uniform resource locator ("URL") to identify a web resource not on the list (step 224). From either choice, the web resource is retrieved from the appropriate server (e.g., server 101 of Figure 1) and processed (step 225) to identify the information units in the resource or structured document, using document manager 106. Manager 106 can be, for example, the document manager described in the Copending Application mentioned above. Processing the retrieved resource is described in further detail below in conjunction with Figures 5 and 6.

Once processed, document manager 106 allows the user to customize the use of the resource (step 226). For example, in one embodiment, the user is allowed to identify the information units to be delivered when  
30 accessing a resource from a specified internet appliance. This example is illustrated in Figures 6-8. Figure 6 shows a web page from <http://www.yahoo.com>. Management server 105 allows a user to customize access to this web page from an internet appliance with  
35 limited display capabilities, such as a mobile



From the menu of step 204, if the user elects to modify a bookmark (step 208), management server 105 allows the user to modify a bookmark from either the list of bookmarks associated with the user (step 234),  
5 or allows the user to edit the list of bookmarks itself (step 233). If the user selects an existing bookmark to modify, the bookmark is retrieved from database system 107 (step 234) and the steps 225-231 described above are carried out. Otherwise, the user is allowed  
10 to edit the list of bookmarks at step 235. The edited bookmark list is confirmed and saved into database 107 (steps 235 and 237). Management server 105 then returns the user to step 204.

From the menu of step 204, if the user elects to  
15 associate a bookmark with a registered device (step 209), management server 105 retrieves the list of bookmarks associated with a specified device (step 238) and allows the user to select from that list bookmarks to be associated with other devices (step 239). The  
20 user can then associated each selected bookmark with one or more devices selected from a list of registered devices (step 240). In fact, management server 105 allows association not only with registered devices (step 242), additional devices can also be created  
25 (step 243). The associations of bookmarks with devices are confirmed and saved into database 107 (steps 244 and 245). Management server 105 then returns the user to step 204.

Figure 5 shows in further detail the bookmark  
30 creation or modification process, in accordance with the present invention. As shown in Figure 5, during the management session 501, at step 502, management server 105 creates a web page (in HTML format, in this example) which is a menu or a form that solicits a user  
35 input of an URL. Upon receiving the URL, the web



108 during an access to a web resource by the internet appliance, in accordance with the present invention. As shown in Figure 3, when the user initiates access, the user first accesses the home page "Myweb2go" (the file "portal.wml"). Upon receiving request for this web page, portal 108 checks if the accessing device is a supported device (step 302). If the accessing device is not supported, a generic error page "errorMsg.wml" is returned (step 306). Otherwise, portal 108 checks whether or not the accessing device is a registered device (step 303). If it is not a registered device, the accessing device is registered using default settings (step 304). Thereafter, the channels and the processed list of bookmarks are made available to the user (step 305).

The above detailed description is provided to illustrate the specific embodiments of the present invention and is not intended to be limiting. Numerous modifications and variations within the scope of the present invention are possible. The present invention is set forth in the following claims.